

42623-0044\_seq listing  
SEQUENCE LISTING



<110> Romeo, Tony  
Wang, Xin  
Desplas, Rebecca L

<120> E.Coli Mutants

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<140> 10/826,967

<141> 2004-04-16

<150> US 60/464,062

<151> 2003-04-17

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 acccgtgagg cagatttagg gttgtttgcc agactggcga atatcggccc gttgcgtnct 180  
 actcnacncg tgccnatgcg cattttgctn ccngcctacg tgaccagcga gttgaaaacc 240  
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 ccaggcgtcg ctatagcctt caagcgccag tttcaacatg cggttgatga cgcgctgttc 180  
 ggtatgggta aactcgcgac cttccacttt ggtcgggaag cgtccatcgc cgccaaacag 240  
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# 42623-0044\_seq listing

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cccgtgaggc agatttaggg ttgtttgcca gactggcgaa taccggcccg ttgcaggac 180  
ctgaagccgt gccgatgcgc attttgctcc cggcctacgt gaccagcgag ttgaaaaccg 240  
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agcgttcaat ggtttgagta aggggcaaaa caggcgggat ttagggcttt tgctgccaca 180  
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# 42623-0044\_seq listing

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agctttttttt ccaantacca tgcttgccnn atgaccataa ngttgcgata tnttcattcc	180
gtgcatgcaa acancgtacc nncagcgcca ccatncaact gatgcgtcng antaatgacc	240
aggttntant tattctntcg cccgagcctc atcancnaan gctcnctttt tnnncggnan	300
nnnnattttt cccngtctnn ntnttgnttn antnnnttac gcggcnacnn attngttntg	360
gtcntacng cnnnataacn gcnnctcncn nncc	394

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<223> n is a, c, g, or t

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ccgaatatat agtggagacg tttagatggg taaaataatt ggtatcgacc tgggtactac 180

caactcttgt gtagcgatta tggatggcac cactcctcgc gtgctggaga acgccgaagg 240

cgatcgcacc acgccttcta tcattgccta taccaggat ggtgaaactc tagttggtca 300

gccggctaaa cgtcaggcag tgacgaaccc gcaaaacact ctgtttgcga ttaaagcct 360

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gttcggtatg ggtaaactcg cgaccttcca ctttggtcgg gaagcgtcca tcgccgcaa 180

acaggttatc cacggcgata aacaccagac tcggtgagaa caccaccagc ccagtgccgc 240

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<222> (6)..(6)

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ggaagttgag tacgtgcggt cggaaatgca ggtgaaatth accaatatca ccacctcgcc      180
gaacgacatt gtggttaaca cgccgttcca tgtggagatt ggcaacctga ccggcggaatt      240
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gctggaagtt gagtacgtgc gttcggaat gcaggtgaaa tttaccaata tcaccacctc      180
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atttaatatc                                     250
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# 42623-0044\_seq listing

gcggcaatca ccactgagcg tgcacgccct tcggcaccga ggatgttctc aataaaatct 180  
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 gatttttacc aaaatcatta ggggattcat cagcgctcca gcccctggag agacgcttnc 120  
 cagtccgcgc gttcaaaaat gccttggtgc aaatagccct ccagctgcgg ccacagggcg 180  
 atggctttat cgagcatcgg atcgtgcct ttggcatacg cgccgacgct aaccagatcg 240  
 cggttacgct gaaaactcga caacagctgt ttgaagggtgc gactcgcgc gtaatgttgc 300  
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 ctagtcgacg cgtggcca 378

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nanannnnnn ncggcannnc cncCNT	207

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 ttcggtgata tacacagtcg tgggaaggcg attgcccgaag agcatttgag cttattcang 180  
 ngccagttaa gtcccntacc aaccatggac gcaatgcaga atattatgcc tgggtacaaa 240  
 atcatntnaa acagcntccc ncaggatctg tgtcgnngng ttcaattatt atnccctcgn 300  
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 cgattaatcc gctggaagtt gactacgtgc gttcggaagt gcaggtgaaa tttaccaata 180  
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 gatgagcatg caggtgtagg ttttgtaacc tggtgttaat tacatccgat ctcaccgcgt 180  
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 gtttcgatgg cttccatcac ccgctggcgc agattactgt ccagtagttg ttgtagcggg 180  
 ttttctcgct gatgatcatc agtaaccagt tcgatgctat cgccgtgctc ttcgcgccac 240  
 tcatcgtagg agaagagctg gctgttattg gtgtcgagca acatttggcg ataatcggca 300  
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 atcgccacct tcaggtttga tatccagtaa cataccatcg ggtgccagtt ttatgcgcag 180  
 cgtacagggtt ttgcctgcat aggacgatgc gtcatagaac ttactttcga tagcagattt 240  
 aatctgcccc gcatagttat tgatatccnc ccccnngta ctagtcgacg cgtggccann 300  
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 gaatccactt cctgcaacag acgctgaatg ctgcatcgt cgacatccac cagattctcg 180  
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 catcggtaat ttcggggcagc ggttaccatc aatcaacaca tattccggcg caatatgcag 300  
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aaaccatatt gcgggaaaac aatatccncc ncccngtac tagtcgacgc gtggccaaat 180

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 catttcgaaa aatcctggtc ataaagatgc gatatccnqn nccnngtac tagtcgacgc 180  
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 cccgcaatta tccatttttg ttattggatt tccattaact ctgactgtcg gcatctcttt 180  
 aatggcggca ttaatgccgt taattgcacc tttttgcgaa catttattca gtgaaatttt 240  
 taatttgctg gctgatatta ttagtgaatt gccattaata taattccgta acgtttatca 300  
 tgttatccta aggattatcc gaaaaataat acctacgaac atcttccagg atactcctgc 360  
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gtatacaggg ttaacattac tgcagcactc aaccaacgca ttttcattat ttgtagctta 240  
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cgcaggaaga ggtgacagaa tcgcctctgg gcggagatga aaatgacgaa ctccatgcca	360
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accgngtaag gngcattcat ntgcataatg tgctgcnanc aatctggctg agnagacaag 180

cncactccca tganacgcat cgcgcattat tntacgtgaa ancggatnna anggntggnt 240

aaacnanga nccnncgccg antatnnttc cncctgncann ctnanntngn ctngnacnga 300

nnncnanncn acncctcttt nttnnnnttcc gntnnngnng nnnnnntng tntccnnc 360

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ttgatatttt ntcttcgntg natggctggt acgcatctac ataantnttg acgatcaccg	180
gtgacntaat aaaanaggnc nnanncantg ccantcccag caatncntgg ttngtggng	240
cggacggtgc tnccatngcn ngacncacnn aaccnannnc natgangntn ccncnganan	300
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 cncnccnngt actagtcgac gcgtggccat ttatnnnnna tntcctnntn gtctcnngnn 240  
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gcgtgagtat gatgcgttta ttaccaacca gttacgtgcg gcgcagacgc aaagtagcgg	180
tctgactgcc cgctatgagc agatgtcgaa aatcgacaat atgctctcca ccagtacctc	240
ttcgttgga acacagatgc aggatttctt caccagcctg caaacgctgg tgagtaacgc	300
ggaagacccg gcagcgcgcc aggcgctgat tgggaaatca gaaggattgg tgaatcagtt	360
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cccgcctaac gatgagtttag ccgcgctgat atcaatggtn atcgtactan tcgacgcgtg	180
gccatgaatg gtgagtttac tgtcgctggt ggcgatcgcc gttttcatat cgncnnttnc	240
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cctgatgcga atgccagtag ctgtaacctg cgctggcaca ggccgcgagg gtaatgaata    180
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gnttttatca acnaaagcac atttttaatt tnatcgaaag ttcccnccnc tttattgctt	300
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gaatcggcgc ggtggagatc atcgccagct cncgcantna cggncagaan tacaggttta	180
accaggatag ccattgttng cttgccacct gcancatagt acggttacc natgatttac	240
tngnaggtta gtgaacaang tgcggncagt nattcancaa cacattnngc atgntctgtc	300
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# 42623-0044\_seq listing

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ataataaaaa aggtcaaaaa cagtgccagc cccagcaata cctggttagg tggcgcgagg 240
ggtgttccca gcgcgttacg caataaacca aaaacaatga tgatgcgggt gaaactggtc 300
atcatcagta aaattgccgg aataaacgtc aacgagggtga tgaacaccag cgtctgcacc 360
gggagcgacc agctttgtcc accgccaggc agcggctggc tggtgatacc cggcagttgc 420
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at 482

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42623-0044\_seq listing

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gatttttgca tcangataat tctgcttgag cgtactgatg acaggagtag ttaataacat	180
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tcactgccgg attgctcggg ctggcctggt ggatacgcg acgcaacaa aaagcgctg	180
ccgaacccaa accggtaaaa atggcagaga ataataccgt tgtcgaagcg acgtggaacg	240
atgtacaact ggaagattct ctgggaatgg aagtgggtta tggactgatc ccgatggtcg	300
atttccagca ggatggtgag ttgttgggcc gtatacgcag tatccgcaag	350

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ccaaaatcat taggggattc atcagcctgg tgcctggaat gcccgaaact ggtatttttg	120
ctgttcactg ccggattgct cgggctggcc tgggtgatac gcggacgcga acaaaaagcg	180

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cctgccgaac ccaaaccggt aaaaatggca gagaataata ccgttgtcga agcgacgtgg      240
aacgatgtac aactggaaga ttctctggga atggaagtgg gttatcgact gatcccgatg      300
gtcgatttcc agcaggatgg tgagttgttg ggccgtatac gcagtatccg caagaaattt      360
gcccaggaga tgggatatcn                                          380

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gtatggggct gttcaacctg ctgcgtcgta gcccggatat atccnccngg ngcgtactag 180

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ttattattac cgaagatctc actcccacaa ttagccttga agattattgt gccgattggg 180

cagtcaaccc gcctgatatc cngnncnnnn gtactagtcg acgcgtggcc atanantnag 240

ctcntnctac nncnnantc ctatccaccc gtggctncag nnancattcn gnnnacacca 300

nttacnnncc agncncntc ccccnngnct cnnectactca nnacttcann anannatgnc 360

nttcnnnnngc nnntcgnctn cccacnacnn cntttnttnc nncctctnnc nanctcnnc 420

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ccatcggcgt agcgcaccagc gcattgagcg cgcgaccac gttattgagg ctggcgctgg 180

aacgtacgct ttgcagcgaa ccgccgctct ggcgtaaadc gatctgcgtt tgtggagtaa 240

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ctgttactga gagattcccc tgcgctaccg cgcagctgtc gagggtcact tcgcgattca 360

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cgttttaccgc taaacttagc gcctacggta cgctgaaaag cgcgctgacg actttccaga	240
ccgccaatat tgcattgtct aaagccgatc ttttttccgc caccagcacc accagcagca	300
ccaccgcggt cagtgccacc actgcgggta acgccatcgc cgggaaatac accatcagcg	360
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gatagcctca ccgccgcgca aaaagcgacg ctaaccncca tttcanatca gcaatcgtcg 180

# 42623-0044\_seq listing

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acngcgttca ntgccnccnc tgcgggnnac nccatcgccn ggaaataccc cattaccgnt 360
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tggcagcaaa catcgccaat gccgataccc ctgggttatca ggcgcgcgat atcgattttg 180
ccagtgaact taaaaaagtc atgcaacgtg gacgggatgc aaccagtgtg gttgcactga 240
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 tcaggcatta atatccagca cagtgnccct ngnnnnncnc nnnnntcca ctgattcaac 180  
 tgcagcttcc agctaataatc aatatcttcg gtgatcatat nagtccacnc ggnnctagtc 240  
 gacgcgtggc cannantnnn ncnttttttn tnnctn 276

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tcgcagcact gtaacgcgta aaatagtgc tttctttact cttctggctg gaccatgaga 180  
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caagttgatt attacgtaat gcctgcacgt aattctgtgg gatatccnnc ccnnncgtac	180
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tgattttttac caaaatcatt aggggggattc atcagagtta agtgtgacag tgggagttaa	120
gtagccaga ggtacaaaca gatcatccag agacggcgga gttaagcaaa ccacancctn	180

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cgnatggncg atttcaactt attaacncgt ttcgatgccn tgntgnagga gccnancatt	240
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ctgtaacgcg ctaaataacg cttgtntctt actcttcttg ctggaccatg agacttctga 180  
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 attttgatac cagcgaacat aagcctgagc actgttgctt gtaacaccat ttttcattgc 240  
 ccgtaatgga acgcggtgag agaggcggtc cagttgcgaa ccaatacgcc agttatcatt 300  
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 aaacaggcag gaaattgana ncantgagnc atnnncnacg anaccaattn ctggcntngc 180  
 cgggcattat ctttttaatt ctctttccca tcattctttc gctatggatt gccttccttt 240  
 gggcaaaatc agaagtgaat aatcagctcc gaacctttgc tcaactggca ctggataaat 300  
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 tttttaatcg ctgatagtga gaaataacgt ctttataacg atcgcgagtt aataacgcgc 360  
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nnacgcgtaa aatagnngctt tctcttactc ttctggctgg accatgagac ttctgattct	180
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gatatcgaat gttatgcaan caganaanan cagnctgttc aaatggctgt gcgattcttg 240  
atagcccgaa atagtcaact tcaggctatc cagagagcgg aattattccg ccaaagtgcg 300  
tttttgctgt tcgagatcgc gttcaatgcc gtcacgaaca tcctggggga ttttcagcgc 360  
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tccaccggcg ttgaggcgtc tattcaggtc aaaccgtctt acggtctgac cgatagcgaa	180
atcgcttcga tgatcaaaga ctcaatgagc tatgccgagc aggacgtaaa agcccgaatg	240
ctggcagaac aaaaagtaga agcggcgcggt gtgctggaac gtctgcacgg cgcgctggct	300
gctgatgccg cgctgttaag cgccgcagaa cgtcaggtca ttgacgatgc tgccgctcac	360
ctgagtgaag tggcgcangg cgatgatgtt gacgccatcg aacaagcgat taaaaacgta	420
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ccagaggtac aaacagatca tccagagacg gcggagttaa gcaaaccaca gctacgcatg	180
gtcgatctca acttattaac cgttttcgat gccgtgatgc aggagcaaaa cattactcgt	240
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ccagaggtac aaacagatca tccagagacg gcggagttaa gcaaaccaca gctacgcatg	180
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cactctccag gtggctgtaa aagagatccg caagttcttc atcggataaa tccggggcaa      180
tggtctcctt gtgataaaaag agctcggta ttattgactg tgcttttttc ggctgatgat      240
ctttgagata agccgatgca acccaatatt gccccaggg cggaataatt tgccccgtct      300
tttttaatcg ctgatagtga gaaataacgt ctttataacg atcgcgagtt aataacgcgc      360
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tggcgttcac natagacca gaaatagacg ccgncnacaa tncacataat ggacataaaa      180

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# 42623-0044\_seq listing

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tgccgcgatt gacgatgcca atttaacgcc agatattcgc gctgatattn ctanncgacg 240

ngcnggnnga cgcgtggcca angcnnnnhn tnnnctnnna annntgnnhn gnnnctggc 300

tgntgtccnn nctgnnancg ccncanaach tcntgncnhtn nnnnangctg ncgccctta 360

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ttacgtaatg cctgcacgta ttctgtggga tatccnnccc ncccgacta gtcgacgcgt 180

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ctcatgcana ttgctgtatt gctctttttg cggcaaaagc cnncatgaag tgcgccagct	180
gannagccgg nccatccctn tatatcnnc nncctgtac ctngncggnc ncgtaggnncn	240
nctcctntcn ttncntctc cccnntctnn nccccctcn ncgcggncnc nctganncg	300
ctcnccttct ntacctcnc gngcctctac cncctgnnc tccccccca cctccttatt	360
ccnccctcnt cntntcctc tccacctntc ctttccnacc gcnncatnnn acgtctcntt	420
ccctnnnncc acnnntnatc cttcngcncc cctcngngcg aancntcnct nnnctancgg	480
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 acacctgcgc tgaatatattg ctcccagcta ttttcatagc ttcgccataa caaatggctt 180  
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 atctgttcag tacgcgtacc tcttccggca ttttgtatga agtggatgct cgactgcgtc 180  
 cgtccggggc ggcgggaatg ctggtgacat ccgcagaagc atttgccgat tatcagaaaa 240  
 acgaggcctg gacgtgggaa catcaggcgc tgggtgcgtgc gcgtgtagtg tacggcgatc 300  
 cgcagctcac cgcgcacttt gacgcagtgc gtcgcgagat tatgacgctg ccgcgtgaag 360  
 gtaaaactct gcaaacggaa gtgcgggaaa tgcgcgagaa aatgcgcgct catctcggca 420  
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 cgctgtatgt gccaaaacag ccgagcaccc tgaaacgcct gttgcatctg ggcagttttg 180  
 ccgtcagcag tttctttccg ctgatggcgc aacgtcgctg gaagccggat cgcattattg 240  
 gcgtggtgcc aacgctgttt tgcgcgccgg gaatgcgctt gctggcgaaa ctctctggtg 300  
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taccagtcgt gtattacgaa caaaatacag aacacgatac cccatactac aaccctataa 180  
aaacgttcga tatngttccg gcntgtgctg cncgncnngt ggncctggcga agctatgaaa 240  
atagctggga gcaaattattc agcgcaggtg ttggtgcctc ctggcnaaaa cattatggca 300  
cggatgtcgt cacccaactc ggctacgggc aacgcattag ttggaatgac gtgattgatg 360  
ctggcgcaac gctacgctgg gaaaaacgac cttatgacgg tgacagagaa cacaacttat 420  
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ataagcctga gcaactgttg ctgtaacacc atttttcatt gcccgtaatg gaacgcggtg 180  
agagaggcgt tccagttgcg aaccaatacg ccagttatca ttaaaatcat atcngccngn 240  
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caagnagac ttcattgacgc tgggtactgt cggaaaaatc agtgaaagcc cagganacac	180
cgtacttacg ccgctcattt tgataccagc gaacataagc ctgagcactg ttgcctgtaa	240
caccattttt cattgcccgt aatggaacgc ggtgagagag gcgttccagt tgcgaaccaa	300
tacgccagnt atcattaaaa tcatatcnnc cngaagagga ctagtcnacg cgtggccann	360
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 cggcgctgac catttatgac atgtgcaaag cggtgcaaaa agatatacncn nncnnngta 180  
 ctagtcgacg cgtggccaaa nactngggnt ctcnntgtgc tngctncnaa tcnantgnac 240  
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agcagcngtt tttctggcat ggactcacgg agaatttttg ctgccgccat gacagactcc	180
acattggagn ggtangcatn ctggncaca cncattcca nantatcnc ttnnctgcn	240
actantnann nctcgnantn ttnctcncn nnnncncan ttcctcnc cc ttnnacnnc	300
gngnnnnttg ttgaannntt nnnacancnc annttcnc cc cncntctnnt anatngncc	360
cnngcctnnn agtnntantn cnntttntc	390

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<211> 392

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caaaatcatt aggggattca tcangggccc ggtaccgttg gctgatattt ccgaacgtca	120
gggaatttcc ctttcttctc tggaacaact gttttcccgt ctgcgtaaaa atggtctggt	180
ttccagcgta cgtggaccag gcggtgggta tctgttaggc aaagatgcca gcagcatcgc	240
cgttggcgaa gtaattagcg ccgttgacga atctgtagat gccaccggtt gtcagggtaa	300
aggcggctgc cagggcggcg ataaatgcct gaccacgcg ctgtggcgtg atttgagcga	360
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<400> 120



# 42623-0044\_seq listing

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cggagcaatt taaacagtgg gcccgcttta aaagtcgtgc gttaactgac ttcacttttag	180
aacttagtgc gcgcgtaaaa gccattcgcg gtccacatat taaaactgca cgaaatattt	240
ttgcacttcc ggtaatacaa cctgaaagtg aagcctgggt tgcacagaat tatgctgatt	300
tcctaaaaag ctatgactgg accgctatta tggctatgcc ttatctggaa ggtgtcgcag	360
aaaaatcggc tgaccaatgg ttaatacaat tgaccaatca aattaataaac atccctcagg	420
ctaaagacaa atctattttta gaattacagg c	451

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cgtgggtgga ttcgaagcag cgaagatgaa tgggctcgcc ttctaccact gcggcgtaa	180
gtacgctact gaccaggcgt ttggaaagtg catcagccac gccaacgtca aacaataaat	240
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naggtaaaa cagatcatnc agagacggng gagttaagca aaccacagct acagcatggt 180  
cgatctcaac ttattaaccg ttttcgatgc cgtgatgcag gancaaaaca ttactcgtgc 240  
cgctcatggt ctgggaatat cncnnnngcn ngnactagtt cgacgcgtgg ccncatanna 300  
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gaggtacaaa cagatcatcc agagacggtg gagttaagca aaccacagct acngcatggt 180

cgatctcaac ttnttaaccg ttntcgatgc cgtgatgcag gagcaaaaca ttactncgtg 240

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tgatttttac caaatcatt aggggattca tcagtcggtg gttaagcaga aattaatatc	120
gcttacttta accaccgcag cacaattagc taattttacg gatgcagaac tcacgctggc	180

# 42623-0044\_seq listing

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gggacgtttt tattgctga gggttgacat ccgtttttgt atccagtaac tctaaaagca    240
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cacggnnggan taantngccc cngnttgenn tctcgctgnt aanganaaat aacgtcttta	180
taacgancgc gagthaataa cgcgccaaga tgatcaacct gaatacnctg gtactgggca	240
gtgcggtctg gggtatcgtg ccacagaatt tctaattgcag cgtattgggc gagggcgcgga	300
tcggcaatgg cataacgntc actttcactg cgcgtaggca taaacgacag tctgaccagt	360
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aaaaaagcga tcgatacagc tacgcgtcag acactgctcg gcaatagcct ggtcgttgta 180

gcaccgaaag ccagcgtgca gaaagatttc accatcgaca gcaaaaccaa ctggacttca 240

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accgatgaca ttctcacctt cgccattaac aaaaatcanc gccacacctg ttgattcgcc	180
tttgatctcg ctgaccggag taanatcccc ntnnnnnngnac tagtcnacgc gtggccatna	240
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cncnnntntc gnnctagncg nngcntggcc angnttnecn cennentnac ncnctccatn 180  
antntnnccn ctntcncna ntacngtgcc cgngnatncc cntcctccgt cggccccnc 240  
nngcttagcn gcnnantggc cnnnnnncaa nttangacga tcngccngcc cnntnaacng 300  
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gcccggaact ctgcttcaaa acctgaagcc aacatctgat gaaaacgctg ctcaatgcgt 180  
tgatggagca gttcacggct cgccggggcg atggcgaact gatgcacctg atacggtaga 240  
gcgtctcctg acgtttgcgt cagttccggt aaagttttac ccgaaatgaa aaaaacttcc 300

# 42623-0044\_seq listing

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agtgcccgga aaagcctttg tggatcattt ggaatgaatcc ttgctgccgc aaccggatct 360
acctcctgaa gttgacgatg caatgactcc caaccttgct ctgccgcctg ttgctcaatt 420
ctggcccgtg cttccgggtc tgccgacggt agcggcgaca acccttccag caatgccttg 480
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taataaaaact atcancgccc aaaaaaacag tgcgatgcgt cgactggcaa ttcacagcaa 180
cgctgaaatg tatgcatgga taaatagcgc gcaggggtgca agagaactta acttgccttc 240
tgtttatgga gatgccgcag aatggaacac agccgaatta agaagagaaa tgtcgcactc 300

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# 42623-0044\_seq listing

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gaataatttg ccccgctctt tttaatcgct gatagtgaga aataacgtct ttataacgat 180
cgcgagttat aacgcgccaa gatgatcaac ctgaatacgc tggtagtggg cagtgcggtc 240
tggtgttatcg tgccacagaa tttctaatagc agcgtattgg gcgagggcgc gatcggcaat 300
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ctattgtaat accaataatt tgctaaggcc tctgactttc tggccgcaat caatacgacc 180
tgtttccctt ttaccgcgga taaccattca ttatcacggt ttataaattc agataaagaa 240
tccgtactga gattgataaa cacgaaatct tttctaattt tctccaacga tagataaatt 300
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 cagtggcgaa tgccgtcgtg ttaattgtct gggcgctgta caataagctg cgttttcaaa 180  
 aacagcagca tcatgcagcc taccaatata cgccgcaaga atatgcagag agcttagcaa 240  
 tacctgatga gctctatcag caactacaaa aaagccacag gatgagcgta cacttcacca 300  
 gccaggggca aataaaaatg gttgtttcag aaaaagcgct agtccgggca taaacaccca 360  
 aaacaaagcc cggttcgccc gggctctgca ccgataacac acttaactgt aggcattgcag 420  
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aaatcattan gggattcatc agtgtggtgt ccggtaaata tgaaaaaggc atnaaactgc	120
nccacgagcc cactgcnaa <del>n</del> gatgnggnaa tctccgcccc gcngcctctc tggcnggtnn	180
ccgttctcac cttnnacacc nccccnngct cncntncnct ccnnacnnc nntttctctc	240
ngcanccac ttnatctncc nncnccctcc cnacgnntcc cncncncng nncnantgnn	300
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 catcgccaaa ttttacttgt ttatccgctg gcatatcnnc ccnnnncgta ctagtcgacg 180  
 cgtggccann 190

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 ataaaactat cagcgcccaa aaaaacagtg cgatgcgtcg actggcaatt cacagcaacg 180  
 ctgaaatgta tgcattggata aatagcgcgc aggggtgcaag agaacttaac ttgccttctg 240  
 tttatggaga tgccgcagaa tggaacacag ccgaattaag aagagaaatg tcgcactcat 300  
 agaaaaatgc gtcattgagta gtatcggatg tgagagttaa ttcagaaagt ttgcgggtaa 360  
 cccttataag ctccatacct ataccagtca ggagtcattt caggatgcca tgcgcgggat 420  
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cattaaaaga gtttgcccag caattatta ccgtacagga aaaatcacca caacggataa 180  
tgcatatcnc ncnnnnnngt actagtcgac gcgtggccac anan 224